CLAIMS

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A position control system for positioning a working component relative to a motive component, which comprises:

an articulated connection between said components;

a locating device associated with said motive component and adapted for providing an output corresponding thereto;

a controller connected to said locating device and adapted for providing an output for positioning said components relative to each other; and

a positioning device connected to said controller and at least one of said components and adapted for positioning said one component relative to the other in response to said controller output.

2. The system of claim 1, which includes:

said locating device comprising a first locating device and including a DGPS receiver adapted for providing GPS output corresponding to the position of said motive component;

a second locating device associated with said working component and adapted for providing an output corresponding thereto;

the output of said second locating device locating said working component in relation to said motive component; and

said positioning device being operably connected to said articulated connection.

3. The system of claim 2, which includes:

said controller being adapted to store DGPS-based straight and curved desired tracks, and providing position-correcting output to said positioning device in response to deviations of said motive component from a desired track.

4. The system of claim 3, which includes:

said articulated connection comprising a power-actuated hitch including a laterally-movable drawbar and a hitch pin mounted thereon and connected to said working component;

said positioning device including said hitch; and

said controller being preprogrammed to laterally shift said hitch in response to deviations of said motive component from a respective desired track whereby said hitch is adapted to generally follow said desired track.

5. The system of claim 4, which includes:

a tilt sensor mounted on one of said components and providing an output corresponding to a tilt condition thereof;

said system being preprogrammed with a tilt-correcting function adapted to proportionally, laterally shift said hitch in response to a detected tilt condition and a required compensating adjustment; and

said system being preprogrammed with a curvature-correcting function adapted to proportionally, laterally shift said hitch in response to a detected curvature of said vehicle track and a required compensating adjustment of said working component track.

6. The system of claim 5 wherein said system is adapted for calibrating said tilt-correcting and curvature-correcting functions in either or both of a stationary and an on-the-fly condition of said system.

7. The system of claim 4, which includes an end-of-row turn compensating function adapted for biasing said hitch laterally outwardly in response to said system detecting an end-of-row condition corresponding to a predetermined cross-track deviation from a desired track.

8. The system of claim 4, which includes:

a steering guide subsystem including a steering display providing cross-track error and heading information to an operator; and

said steering guide subsystem being connected to said controller whereby said steering display information is based on GPS data.

9. The system of claim 4, which includes:

an automatic steering subsystem connected to said motive component and to said controller, said automatic steering subsystem being adapted to automatically guide said motive component along a desired track.

10. The system of claim 4, which includes:

said hitch having a clevis configuration;

said drawbar having a front end pivotably connected to said motive component and a trailing end connected to said working component;

an hydraulic subsystem including an hydraulic pressure source associated with said motive component, an hydraulic actuator connected to said hydraulic pressure source and to said drawbar for pivoting same and an hydraulic valve selectively

controlling pressurized hydraulic fluid flow from said pressure source to said hydraulic actuator;

said controller being connected to said hydraulic valve and adapted for controlling the operation of same;

said hitch including an hydraulic piston-and-cylinder unit connected to said hydraulic power source and to said drawbar, said piston-and-cylinder unit being adapted for pivoting said drawbar; and

said second locating device including a potentiometer connected to said piston-and-cylinder unit and adapted for providing an output signal proportional to a position of said piston-and-cylinder unit and corresponding to the orientation of said hitch.

11. The system of claim 10, which includes:

a lateral hitch position control input adapted for biasing said drawbar left and right; and

a hitch centering control input adapted for centering said drawbar on said hitch; and

said left, right and center positions of said drawbar causing said potentiometer to provide corresponding output to said controller for controlling said positioning device.

12. The system of claim 3, which includes:

a straight line operating mode adapted for guiding said implement along a relatively straight-line track; and

a contour operating mode adapted for guiding said implement along a curvilinear track.

13. The system of claim 5 wherein said turning radii compensation is based on motive component speed and rate-of-turn.

14. The system of claim 3, which includes DGPS correction capability utilizing a signal correction system from among the group consisting of: WAAS (Wide Area

Augmentation System), EGNOS (European Geostationary Navigation Overlay System) and MSAS (Multifunctional Transport Satellite Space-based Augmentation System).

15. The system of claim 4, which includes:

a display device including an arcuate array of indicator lights adapted for displaying an approximate real-time position of said working component relative to a desired track thereof;

said indicator light array of having a generally downwardly convex configuration with a center light indicating a hitch position approximately over said desired track and cross-track error of said working component position being proportionally indicated by corresponding multiples of indicator lights to each side of said center light; and

said controller being connected to said display device whereby said display device receives working component position output from said controller and displays representations of said implement position in response thereto.

16. The system of claim 11 wherein said controller is adapted for calibration relative to said valve potentiometer.

17. The system according to claim 16 wherein said controller calibration is relative to one or more of the factors comprising cross-track error, guidepath curvature and motive component tilt.

18. A position control system for positioning a working component relative to a motive component, which comprises:

an articulated connection between said components comprising a power-actuated hitch including a laterally-movable drawbar and a hitch pin mounted thereon and connected to said working component;

said hitch having a clevis configuration;

said drawbar having a front end pivotably connected to said motive component and a trailing end connected to said working component by said hitch pin;

an hydraulic subsystem including an hydraulic pressure source associated with said motive component, an hydraulic actuator connected to said hydraulic pressure source and to said drawbar for pivoting same and an hydraulic valve selectively controlling pressurized hydraulic fluid flow from said pressure source to said hydraulic actuator;

said controller being connected to said hydraulic valve and adapted for controlling the operation of same;

said hitch including an hydraulic piston-and-cylinder unit connected to said hydraulic power source and to said drawbar, said piston-and-cylinder unit being adapted for pivoting said drawbar;

a first locating device associated with said motive component and including a DGPS receiver adapted for providing GPS output corresponding to the position of said motive component;

a second locating device associated with said working component and adapted for providing an output corresponding thereto, the output of said second locating device locating said working component in relation to said motive component;

said second locating device including a potentiometer connected to said piston-and-cylinder unit and adapted for providing an output signal proportional to a position of said piston-and-cylinder unit and corresponding to the orientation of said hitch drawbar;

a controller connected to said locating devices and including an output for positioning said components relative to each other;

said controller being adapted to store DGPS-based straight-line and contour desired tracks, and providing position-correcting output to said positioning device in response to deviations of said motive component from a desired track;

said controller being preprogrammed to laterally shift said hitch in response to deviations of said motive component from a respective desired track whereby said hitch is adapted to generally follow said desired track;

a tilt sensor mounted on one of said components and providing an output corresponding to a tilt condition thereof;

said system being preprogrammed with a tilt-correcting function adapted to proportionally, laterally shift said hitch in response to a detected tilt condition and a required compensating adjustment;

said system being preprogrammed with a curvature-correcting function adapted to proportionally, laterally shift said hitch in response to a detected curvature of said vehicle track and a required compensating adjustment of said working component track; and

a display device connected to said controller and adapted to receive working component position output therefrom and display representations of said implement position in response thereto.

19. A method of positioning a working component relative to a motive component, which method comprises the steps of:

providing an articulated connection between said components;

providing a controller;

generating a signal corresponding to said motive component and inputting same to said controller; and

positioning said working component relative to said motive component in response to said first component signal input.

20. The method of claim 19, which includes the additional steps of:

establishing a desired straight-line or contour track for said motive component;

guiding said motive component generally along said desired track;

determining motive component deviation from said desired track; and

positioning said working component with respect to said desired track in response to said deviation.

21. The method of claim 20, which includes the additional steps of:

defining said desired track and said motive component deviation therefrom with GPS coordinates;

inputting said GPS coordinates to said controller; and

comparing said desired track and deviation GPS coordinates.

22. The method of claim 21, which includes the additional steps of:

generating a radius of curvature through a contour track of said motive component;

smoothing said radius of curvature; and

positioning said working component with respect to said smoothed radius of curvature.

23. The method of claim 21, which includes the additional steps of:

providing a Follow GPS/Guidance operating mode of said controller;

compensating for motive component deviation from said desired track; and

positioning said working component on said desired track.

24. The method of claim 21, which includes additional steps of:

providing a Follow/Match Tracks operating mode of said controller;

generating a tilt signal corresponding to a tilt of said system and inputting same to said controller;

generating a curve compensation as a function of system speed and course change; and

positioning said working component on said motive component track in response to said tilt signal and said curve compensation.

25. The method of claim 21, which includes additional steps of:

detecting an end-of-row location of said system;

turning said system around at said end-of-row location; and

biasing said working component to the outside of said end-of-row turn.